

# Energy Storage for Manufacturing & Industrial Decarbonization

## Energy StorM Workshop

### Feb. 8 – 9, 2022



Cliff Ho, Ph.D.  
Sandia National Laboratories



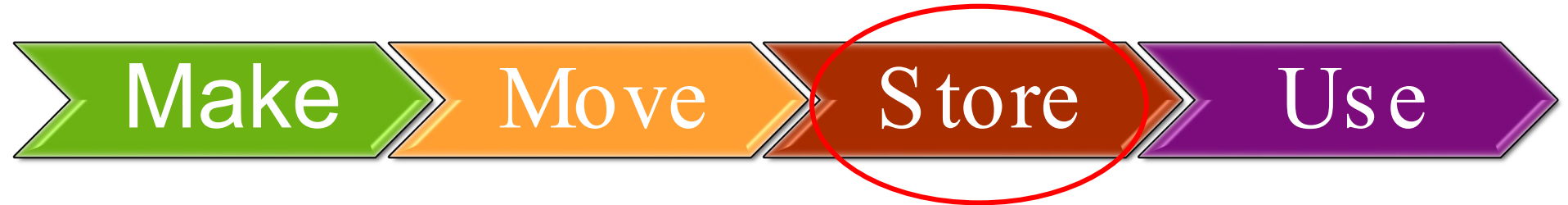
Name	Institution
Slaughter, Julie	Ames
Iloeje, Nwike	ANL
Krumdick, Gregory K.	ANL
Supekar, Sarang	ANL
Marschilok, Amy	BNL
Bauer, Diana	DOE AMO
Cresko, Joe	DOE AMO
Kao, Emmeline	DOE Fellow
Ginosar, Daniel	INL
Liaw, Boryann	INL
Wendt, Lynn	INL
Bakhtian, Noel	LBL
Kaur, Sumanjeet	LBL
Lubner, Sean	LBL
Rao, Prakash	LBL
Joo, Jhi Young	LLNL
Reese, Samantha	NREL
Reed, David	PNNL
Viswanathan, Vilayanur	PNNL
Hertz, Kristin	SNL
Ho, Clifford	SNL
Montes, Marisa	SNL
Roberts -Baca, Sam	SNL



- Total unique registrants: ~1000
  - Total unique attendees on Day 1 (logged in at least once during Day 1): 536
  - Total unique attendees on Day 2 (logged in at least once during Day 1): 467



- Energy StorM is **not** about manufacturing batteries
- Energy StorM is about **energy** and **storage needs, gaps, and opportunities** to **decarbonize manufacturing** and industrial processes



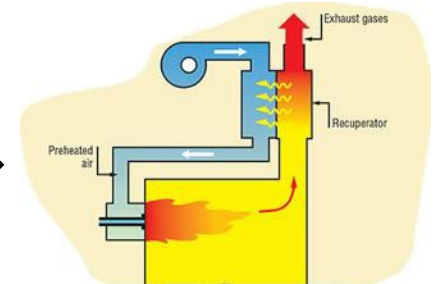
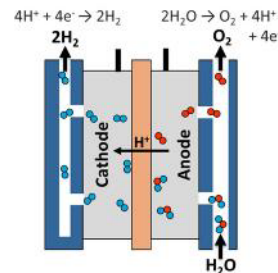
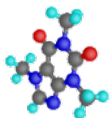
Electrical



Thermal



Chemical





# Day 1

Time (Eastern)	Presenter	Chairs
11:10 AM	DOE Opening Remarks	Kelly Speakes-Backman, DOE EERE
11:25 AM	Energy Storage for Manufacturing	Joe Cresko, DOE AMO
11:45 AM	Highlights of Past Workshops	Avi Shultz, DOE SETO Jeff Moore, SWRI
12:05 PM	Break	



# Day 1

Time (Eastern)	Session	Chairs
12:15 PM	<p><a href="#"><u>DOE Panel</u></a></p> <p>➤ Programs &amp; Priorities for Industrial Decarbonization</p>	Alejandro Moreno, DOE EERE
2:00 PM	<p><b>Showcase</b></p> <p>➤ Real-world example of energy storage for manufacturing</p>	Lori Shaefer-Weaton, Agri-Industrial Plastics Co.
2:20 PM	<p><b>Industry Needs</b></p> <p>➤ Shell</p> <p>➤ Washington Mills</p> <p>➤ General Motors</p> <p>➤ ArcelorMittal</p> <p>➤ Synhelion / CEMEX</p>	Prakash Rao, LBL Nwike Iloeje, ANL



## Day 2

Time (Eastern)	Session	Chairs
11:00 AM	<b>Electrochemical Storage</b> <ul style="list-style-type: none"><li>➤ EPRI</li><li>➤ Urban Electric Power</li><li>➤ StorEn</li><li>➤ North American Electric Reliability Corporation</li><li>➤ EDF Renewables North America</li></ul>	Boryann Liaw, INL Amy Marschlok, BNL
12:25 PM	<b>Thermal Storage</b> <ul style="list-style-type: none"><li>➤ Phase Change Solutions</li><li>➤ Malta, Inc.</li><li>➤ Azelio</li><li>➤ Siemens Gamesa</li><li>➤ Antora</li><li>➤ Heliogen</li><li>➤ INL</li></ul>	Sumanjeet Kaur, LBL Julie Slaughter, Ames Lab



## Day 2

Time (Eastern)	Session	Chairs
11:00 AM	<b>Chemical Storage</b> <ul style="list-style-type: none"><li>➤ EPRI</li><li>➤ Urban Electric Power</li><li>➤ StorEn</li><li>➤ North American Electric Reliability Corporation</li><li>➤ EDF Renewables North America</li></ul>	Kristin Hertz, SNL Lynn Wendth, SNL
12:25 PM	<b>Analysis &amp; Valuation</b> <ul style="list-style-type: none"><li>➤ Strategen</li><li>➤ ANL</li><li>➤ NREL</li><li>➤ TU Wien</li><li>➤ PNNL</li></ul>	Sarang Supekar, ANL Daniel Ginosar, INL



- Participants represented a good cross-section of industry, national labs, academia, utility, government, and non-profit
- Large interest in decarbonizing chemicals and petrochemicals, cement and steel, automotive manufacturing, food processing
- Technologies perceived as most suited to provide energy storage for industrial decarbonization include thermal, electrochemical, hydrogen, pumped hydro, biofuels, compressed air, and other storage
- Desired duration of energy storage for industrial decarbonization was 10 – 24 hours, 4 – 10 hours, and days
- Specified power requirements for industrial processes were 10 – 100 MW, 1 – 10 MW, >100MW
- Energy storage for manufacturing and industrial processes is nascent, but nearly all participants stated that it would necessary for industrial decarbonization

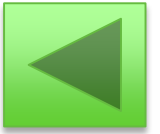
# DOE Opening Remarks

## Kelly Speakes-Backman

Principal Deputy Assistant Secretary  
DOE Office of Energy Efficiency and Renewable Energy



## Energy Storage for Manufacturing & Industrial Decarbonization Energy StorM Workshop



# DOE Panel

## Programs & Priorities for Industrial Decarbonization



**Alejandro Moreno**  
Deputy Assistant Secretary  
for Renewable Energy

**Joe Paladino**  
Office of Electricity

**Eric Miller**  
Hydrogen & Fuel Cell  
Technologies Office

**Jay Fitzgerald**  
Bioenergy  
Technologies Office

**Avi Shultz**  
Solar Energy  
Technologies Office

**Alexis McKittrick**  
Geothermal  
Technologies Office

**Jason Marcinkoski**  
Office of Nuclear Energy

**Joe Cresko**  
Advanced Manufacturing  
Office

# Showcase



**Lori Shaefer-Weaton**  
President, Agri-Industrial Plastics



## Energy Storage for Manufacturing & Industrial Decarbonization Energy StorM Workshop

# Industry Needs



**Prakash Rao**  
LBNL



**Nwike Iloeje**  
ANL



## Energy Storage for Manufacturing & Industrial Decarbonization Energy StorM Workshop

# Electrochemical Storage



Boryann Liaw  
INL



Amy Marschilok  
BNL

A collage of images related to energy and sustainability, including wind turbines, a close-up of a kilowatt-hour meter, a construction site with heavy machinery, a residential house, a white SUV, solar panels, and an electric vehicle charging cable.

## Energy Storage for Manufacturing & Industrial Decarbonization

## Energy StorM Workshop

# Thermal Storage



Sumanjeet Kaur  
LBL



Julie Slaughter  
Ames Laboratory



## Energy Storage for Manufacturing & Industrial Decarbonization Energy StorM Workshop

# Chemical Storage



Kristin Hertz  
SNL



Lynn Wendt  
INL



## Energy Storage for Manufacturing & Industrial Decarbonization Energy StorM Workshop

# Analysis & Valuation



Sarang Supekar  
ANL



Daniel Ginosar  
INL



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